Question44:

44. Time Series Analysis

Task:

• a) Load the temperature\_data.csv file into a Pandas DataFrame. The file contains the columns:

Date and Temperature (Celsius).

• b) Convert the Date column to the Pandas datetime data type.

• c) Calculate the average temperature for each month and display the results in chronological order.

• d) Plot a line chart to visualize the temperature trend over time.

Answer:

import pandas as pd

import matplotlib.pyplot as plt

temp\_df = pd.read\_csv("temperature\_data.csv")

temp\_df['Date'] = pd.to\_datetime(temp\_df['Date'])

temp\_df['Month'] = temp\_df['Date'].dt.to\_period('M')

monthly\_avg\_temp = temp\_df.groupby('Month')['Temperature (Celsius)'].mean().reset\_index()

monthly\_avg\_temp['Month'] = monthly\_avg\_temp['Month'].dt.to\_timestamp()

plt.figure(figsize=(10, 5))

plt.plot(temp\_df['Date'], temp\_df['Temperature (Celsius)'])

plt.plot(monthly\_avg\_temp['Month'], monthly\_avg\_temp['Temperature (Celsius)'], color='red')

plt.title('Temperature Trend Over Time')

plt.xlabel('Date')

plt.ylabel('Temperature (Celsius)')

plt.grid(True)

plt.tight\_layout()

plt.show()

Output:

